In light of the Amendments and arguments set forth above, Applicants believe they are entitled to a letters patent. The Examiner is encouraged to telephone the undersigned with any questions.

Respectfully submitted,

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VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE SPECIFICATION

Please amend paragraph [0007] as follows:

Another challenge presented by fabrication of optical components is controlling the roughness of surfaces that result from applying the etching medium. For instance, a rough surface can cause scattering and/or undesirable reflection of a light signal. The etching media employed to form optical components are often applied to the wafer in a series of repeated cycles. The Bosch process is an example of an etching technique that employs a series of consecutively repeated cycles. Each cycle includes applying an etching medium to the light transmitting medium followed by applying a passivant to the light transmitting medium. Each cycle results in formation of a bump on the surface being formed. As a result, the repeated cycles is an undesirable source of roughness. <u>For instance, the Bosch method typically provides a roughness of about 220 nm.</u>

IN THE CLAIMS

96. (Added) A method of forming an optical component, comprising:

forming a mask over a light transmitting medium so as to protect a region of the light transmitting medium where a waveguide is to be formed; and

applying an etching medium including a fluorine-containing gas, one or more partial passivants and oxygen to the light transmitting medium so as to form one or more waveguide surfaces with a smoothness less than 220 nm.

97. (Added) The method of claim 96, wherein the fluorine-containing gas includes SF_6 and the partial passivant includes HBr.

98. (Added) The method of claim 96, wherein the fluorine-containing gas is selected from a group consisting of SF_6, Si_2F_6 and NF_3.

99. (Added) The method of claim 96, wherein the partial passivant is selected from a group consisting of HBr, SiF_4, C_4F_8, CH_2F_2 and CHF_3.

100. (Added) The method of claim 96, wherein the one or more surfaces includes a sidewall of the waveguide.

101. (Added) The method of claim 96, wherein the one or more surface includes a waveguide facet.

102. (Added) The method of claim 96, wherein the etching medium is applied at a pressure of 1 mTorr to 600 mTorr.

103. (Added) The method of claim 96, wherein the etching medium is applied at a pressure of 1 mTorr to 60 mTorr.

104. (Added) The method of claim 96, wherein the etching medium is applied at a pressure of 10 mTorr to 30 mTorr.

105. (Added) The method of claim 96, wherein the etching medium includes one or more other media.

106. (Added) The method of claim 96, wherein the one or more other media is selected from the group consisting of SiF_4 and SiF_6

107. (Added) The method of claim 96, wherein the one or more other media include a noble gas.

108. (Added) The method of claim 96, wherein the etching medium has a molar ratio of partial passivant to fluorine-containing gas of 0.1 to 100.

109. (Added) The method of claim 96, wherein the etching medium has a molar ratio of partial passivant to fluorine-containing gas of .5 to 20.

110. (Added) The method of claim 96, wherein the etching medium has a molar ratio of fluorine-containing gas to oxygen of .1 to 10.

111. (Added) The method of claim 96, wherein the mask is formed so as to protect a region of the light transmitting medium where a plurality of waveguides are to be formed and the etching medium is applied to as to form one or more surfaces on at least one of the waveguides.

112. (Added) The method of claim 96, wherein the mask is an oxide mask.

113. (Added) The method of claim 96, wherein the etching medium is applied in an inductively coupled plasma etch.

114. (Added) The method of claim 96, wherein the waveguide is formed on a wafer having one or more dimensions with a length greater than 6 inches.

115. (Added) The method of claim 96, wherein the waveguide is formed on a wafer having one or more dimensions with a length of at least 8 inches.

116. (Added) The method of claim 96, wherein the one or more surfaces are formed with a smoothness of at most 25 nm.

117. (Added) The method of claim 96, wherein the etching medium is applied continuously during formation of the one or more surfaces.

118. (Added) The method of claim 96, wherein the light transmitting medium is silicon.

119. (Added) The method of claim 96, wherein the etching medium is applied such that the fluorine containing gas has a uniformity of 20% or less across the surface of the wafer.

120. (Added) The method of claim 96, wherein the etching medium is applied such that the fluorine containing gas has a uniformity of 10% or less across the surface of the wafer.

121. (Added) The method of claim 96, wherein the partial passivant includes CHF_3.

122. (Added) The method of claim 121, wherein the fluorine-containing includes SF_6.

123. (Added) The method of claim 96, wherein the partial passivant includes C_4F_8.

124. (Added) The method of claim 123, wherein the fluorine-containing includes SF_6.

125. (Added) A method of forming an optical component, comprising:

obtaining an optical component having a light transmitting medium positioned over a base; and

applying an etching medium including a fluorine-containing gas, a partial passivant and Oxygen to the light transmitting medium so as to form one or more waveguide surfaces with a smoothness less than 220 nm.

126. (Added) The method of claim 125, wherein the fluorine-containing gas includes SF_6 and the partial passivant includes HBr.

127. (Added) The method of claim 125, wherein the fluorine-containing gas is selected from a group consisting of SF_6, Si_2F_6 and NF_3.

128. (Added) The method of claim 125, wherein the partial passivant is selected from a group consisting of HBr, SiF_4, C_4F_8, CH_2F_2 and CHF_3.

129. (Added) The method of claim 125, wherein the etching medium is applied at a pressure of 1 mTorr to 200 mTorr.

130. (Added) The method of claim 125, wherein the etching medium is applied at a pressure of 5 mTorr to 60 mTorr.

131. (Added) The method of claim 125, wherein the etching medium includes a second fluorine-containing gas selected from the group consisting of SiF_4 and SiF_6.

132. (Added) The method of claim 125, wherein the etching medium also includes a noble gas.

133. (Added) The method of claim 125, wherein the etching medium has a molar ratio of partial passivant to fluorine-containing gas of 0.1 to 100.

134. (Added) The method of claim 125, wherein the etching medium has a molar ratio of partial passivant to fluorine-containing gas of .5 to 20.

135. (Added) The method of claim 125, wherein the etching medium has a molar ratio of fluorine-containing gas to oxygen of .1 to 10.

136. (Added) The method of claim 125, wherein the mask is formed so as to protect a region of the light transmitting medium where a plurality of waveguides are to be formed and the etching medium is applied to as to form one or more surfaces on at least one of the waveguides.

137. (Added) The method of claim 125, wherein the etching medium is applied so as to form at least one surface on a plurality of waveguides.

138. (Added) The method of claim 125, wherein the etching medium consists of only SF6 as the fluorine-containing gas, HBr as the partial passivant and Oxygen.

139. (Added) The method of claim 125, wherein the etching medium is applied in an inductively coupled plasma etch.

140. (Added) The method of claim 125, wherein the waveguide is formed on a wafer having one or more dimensions with a length greater than 6 inches.

141. (Added) The method of claim 125, wherein the waveguide is formed on a wafer having one or more dimensions with a length of at least 8 inches.

142. (Added) The method of claim 125, wherein the one or more surfaces are formed with a smoothness of at most 25 nm.

143. (Added) The method of claim 125, wherein the etching medium is applied continuously during formation of the one or more surfaces.

144. (Added) The method of claim 125, wherein the light transmitting medium is silicon.

145. (Added) The method of claim 125, wherein the etching medium is applied such that the fluorine containing gas has a uniformity of 20% or less across the surface of the wafer.

146. (Added) The method of claim 125, wherein the etching medium is applied such that the fluorine containing gas has a uniformity of 10% or less across the surface of the wafer.

147. (Added) A method of forming an optical component, comprising:

forming a mask over a light transmitting medium so as to protect a region of the light transmitting medium where a waveguide is to be formed; and

applying an etching medium including SF_6, one or more partial passivants and Oxygen to the light transmitting medium so as to form one or more waveguide surfaces with a smoothness less than 220 nm.

148. (Added) The method of claim 147, wherein the partial passivant includes C_4F_8.

149. (Added) The method of claim 147, wherein the partial passivant includes CHF_3.

150. (Added) The method of claim 147, wherein the one or more surface includes a waveguide facet.

151. (Added) The method of claim 147, wherein the etching medium is applied at a pressure of 10 mTorr to 30 mTorr.

152. (Added) The method of claim 147, wherein the etching medium includes one or more other media.

153. (Added) The method of claim 147, wherein the one or more other media is selected from the group consisting of SiF_4 and SiF_6

154. (Added) The method of claim 147, wherein the one or more other media include a noble gas.

155. (Added) The method of claim 147, wherein the etching medium has a molar ratio of partial passivant to fluorine-containing gas of 0.1 to 100.

156. (Added) The method of claim 147, wherein the etching medium has a molar ratio of partial passivant to fluorine-containing gas of .5 to 20.

157. (Added) The method of claim 147, wherein the etching medium has a molar ratio of fluorine-containing gas to oxygen of .1 to 10.

158. (Added) The method of claim 147, wherein the etching medium is applied in an inductively coupled plasma etch.

159. (Added) The method of claim 147, wherein the waveguide is formed on a wafer having one or more dimensions with a length greater than 6 inches.

160. (Added) The method of claim 147, wherein the waveguide is formed on a wafer having one or more dimensions with a length of at least 8 inches.

161. (Added) The method of claim 147, wherein the one or more surfaces are formed with a smoothness of at most 25 nm.

162. (Added) The method of claim 147, wherein the etching medium is applied continuously during formation of the one or more surfaces.

163. (Added) The method of claim 147, wherein the light transmitting medium is silicon.

164. (Added) A method of forming an optical component, comprising:

forming a mask over a light transmitting medium so as to protect a region of the light transmitting medium where a waveguide is to be formed; and

applying an etching medium including a fluorine containing gas, CHF_3 and Oxygen to the light transmitting medium so as to form one or more waveguide surfaces with a smoothness less than 220 nm.

165. (Added) The method of claim 164, wherein the fluorine-containing gas is selected from a group consisting of SF_6, Si_2F_6 and NF_3.

166. (Added) The method of claim 164, wherein the etching medium is applied at a pressure of 10 mTorr to 30 mTorr.

167. (Added) The method of claim 164, wherein the etching medium has a molar ratio of partial passivant to fluorine-containing gas of .5 to 20.

168. (Added) The method of claim 164, wherein the etching medium has a molar ratio of fluorine-containing gas to oxygen of .1 to 10.